32692
Customer Number

Patent
Case No.: 52955US011

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

First Named Inventor:	DEBE, MARK K.		
Application No.:	10/014268	Confirmation No.:	5103
Filed:	October 22, 2001	Group Art Unit	1795
Title:	STORAGE AND DELIVERY OF GASES IN PRESSURIZED MICROBUBBLES		

REPLY BRIEF ON APPEAL

Mail Stop: Appeal Brief-Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

CERTIFICATE OF MAILING OR TRANSMISSION [37 CFR § 1.8(a)]
I hereby certify that this correspondence is being transmitted by facsimile on the date shown below to the United States Patent and Trademark Office at 571-273-8300.

July 24, 2008
Date

Signed by: Philip Dahl

Dear Sir:

This Reply Brief follows the Examiner's Answer mailed on July 11, 2008.

Fees

☐ Any required fee under 37 CFR § 41.20(b)(2) will be made at the time of submission via EFS-Web. In the event fees are not or cannot be paid at the time of EFS-Web submission, please charge any fees under 37 CFR § 1.17 which may be required to Deposit Account No. 13-3723.

☒ Please charge any fees under 37 CFR §§ 37 CFR § 41.20(b)(2)1.16 and 1.17 which may be required to Deposit Account No. 13-3723.

☒ Please charge any additional fees associated with the prosecution of this application to Deposit Account No. 13-3723. This authorization includes the fee for any necessary extension of time under 37 CFR § 1.136(a). To the extent any such extension should become necessary, it is hereby requested.

☒ Please credit any overpayment to the same deposit account.

RECEIVED
CENTRAL FAX CENTER
JUL 24 2008

ARGUMENT

First Ground of Rejection

Claims 31 and 32 stand rejected under 35 USC § 102(b) as purportedly anticipated by GB 1,439,440 (Pedrick). Applicants respectfully request reversal of this rejection.

The Examiner's Answer asserts, "Engines and vehicles are well known to inherently include a throttle that releases fuel in response to the need required by the engine." (at page 4). Where would a throttle be fitted on the Pedrick device? **Pedrick's device must consume exactly one "fuel pellet" per cycle**, no more or less. Examination of the disclosure of Pedrick reveals that no variation in the amount of fuel fed to the engine is possible and therefore no "throttle" can be fitted to the Pedrick device. Pedrick's device is only capable of one rate of fuel consumption, and therefore one rate of power output, and therefore it *cannot adjust to consume more fuel per cycle* in response to an increasing load.

The Examiner's Answer asserts, without support, that "the speed of rotation of the engine crank shaft is determined by the operator of the engine or automobile" and "it is clear that the operator of the vehicle or engine determines the load on the engine and the appropriate amount of fuel necessary to power the engine." (at page 6). The Examiner's Answer does not suggest any means by which the operator can make such adjustments, other than the inherently impossible "throttle," nor does Pedrick discloses any such means. In fact, such adjustments are *inherently impossible* for the Pedrick device, since consideration of Pedrick's device indicates that it *must* consume exactly one "fuel pellet" per cycle.

Applicants' additionally point out that the § 102(b) rejection over Pedrick must fail because Pedrick fails to teach or suggest "an electrochemical power device," as recited in the present claims. In response, the Examiner's Answer asserts that "Pedrick teaches *electron transfer to oxygen from the combustion of hydrogen* to form water . . . . It is the same electrochemical reaction used to form water in a fuel cell." (Emphasis added.) This interpretation of "electrochemical power device" distorts all common understanding. The differences between a flame and a fuel cell are many and varied, but they include at a minimum the fact that a flame does not produce an electric current. The Examiner's interpretation would require the false premise that electrochemistry is all chemistry.

Thus, the rejection of claims 31 and 32 under 35 USC § 102(b) has been overcome and should be reversed.

Second Ground of Rejection

Claims 31-33 stand rejected under 35 USC § 103(a) as purportedly unpatentable over Monsler et al, "Glass Microshell Parameters for Safe Economical Storage and Transport of Gaseous Hydrogen," April 1, 1996, Fuel Cells for Transportation TOPTEC Meeting (Monsler) in view of US5,432,710 (Ishimaru) or US 5,009,067 (Scheffler). Applicants respectfully request reversal of this rejection.

As Applicants have noted, each of these rejections under § 103(a) depend on the purported teaching in Monsler of the claim element: "b) a means for causing release of said gas from said microbubbles by fracturing." However, Monsler does not teach fracturing to recover hydrogen. Instead, Monsler teaches that the permeability of the glass microbubbles to hydrogen is temperature dependent in a reversible manner, and heat can be used both the fill the glass microbubbles with hydrogen and to release hydrogen from the glass microbubbles (See Monsler at 4-5, 13-14 and 16; including chart titled "Permeability constant vs. temperature increase above 20°C, for hydrogen in glass microspheres . . ." at 16, and chart titled "Time constant vs. temperature increase above 20°C, for exponential fill or release of hydrogen using glass microspheres" at 13). Filling microbubbles by use of heat is also demonstrated in the present Specification, at Examples 1 and 5. It follows that heating does *not* fracture the microbubbles, which would be an irreversible process, but, to the contrary, heating *reversibly* alters the permeability of the microbubbles to hydrogen, to allow both *filling* with hydrogen and *releasing* hydrogen. If heating fractured the microbubbles, heating could not be used to *fill* the microbubbles.

The Examiner's Answer attempts to equate fracturing with "pore forming," on the premise that the heat-dependent release of hydrogen from microbubbles reported in Monsler must involve formation of "pores." That premise is based on this passage in Monsler:

> "The permeability of glass to hydrogen is such a strong function of temperature that the glass effectively switches from impermeable @ 27°C to porous @ 150-200°C" (Monsler at 14).

At the outset, the Examiner's Answer is completely dependent on Monsler's substitution of the world "porous" for "permeable" at one location. (Compare the use of "permeability" in the remainder of page 14 and in the chart titled "Permeability constant vs. temperature increase

above 20°C, for hydrogen in glass microspheres . . ." at page 16). Monsler does not report any observation of any "pores," of any size or shape, nor does Monsler report the existence of any "pores." Monsler reports a temperature-dependent, reversible change in the permeability of thin-walled glass microspheres to the passage of hydrogen atoms. Needless to say, hydrogen atoms are very small, and the Examiner points to no evidence or disclosure that permeability to hydrogen atoms requires formation of a "pore."

In attempting to equate fracturing with supposed "pore forming," the Examiner's Answer quotes a dictionary definition of "fracture" which, however, supports Appellants' position:

> "Fracture . . . v.t. . . . To cause a fracture or fractures in; to break; to burst asunder; to crack; to separate the continuous parts of; as, to fracture a bone; to fracture the skull." (Answer at 8.)

As noted, both Monsler and the present Specification demonstrate that the glass microspheres can be heated to *fill* them with hydrogen. After the heat is removed, intact microbubbles filled with hydrogen remain. The microbubbles are not broken, burst asunder, cracked, nor are continuous parts separated; they are not, by the definition asserted by the Examiner, "fractured." If they were fractured, they could not continue to contain monatomic hydrogen gas. Needless to say, hydrogen atoms are very small, and containing hydrogen atoms requires the absence of any "pore."

Simply put, heat could not be used to *fill* microbubbles if its effect was to *fracture* the microbubbles. Both Monsler and the present Specification demonstrate that heating *reversibly* alters the permeability of the microbubbles to hydrogen to allow filling. To interpret this reversible change in permeability as fracturing is once again an interpretation that distorts all common understanding. The Monsler reference itself, taken with the definition of "fracture" quoted by the Examiner, demonstrate that heating to reversibly alter permeability cannot be characterized as "fracturing".

Thus, the rejection of claims 31-33 under 35 USC § 103(a) has been overcome and should be reversed.

CONCLUSION

For the foregoing reasons, appellants respectfully submit that the Examiner has erred in rejecting this application. Please reverse the Examiner on all counts.

Respectfully submitted,

July 24, 2008
Date

By: _____
Philip Y. Dahl, Reg. No.: 36,115
Telephone No.: 651-737-4029

Office of Intellectual Property Counsel
3M Innovative Properties Company
Facsimile No.: 651-736-3833